

AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A field emission-type emission electron source including comprising an insulative substrate and an electron source element formed on the side of one surface of said insulative substrate, said electron source element having comprising:
 - a lower electrode;
 - a surface electrode; and
 - a strong-field drift layer including polycrystalline silicon and disposed between said lower electrode and said surface electrode, said strong-field drift layer allowing electrons to pass therethrough according to an electric field generated when a certain voltage is applied to said lower and surface electrodes in such a manner that said surface electrode has a higher potential than that of said lower electrode, said field emission-type emission electron source comprising:
 - a buffer layer provided between said strong-field drift layer and said lower electrode [[layer]], said buffer layer having an electrical resistance greater than that of said polycrystalline silicon, and said buffer layer being composed of a film which is uniformly formed over the whole area on the side of said surface of said insulative substrate.

2. (Currently Amended) The field ~~emission-type~~ emission electron source according to claim 1, wherein said buffer layer includes an amorphous layer.

3. (Currently Amended) The field ~~emission-type~~ emission electron source according to claim 1, in which a plural number of said electron source elements are formed on the side of said surface of said insulative substrate, wherein said insulative substrate includes a glass substrate allowing infrared rays to transmit therethrough, and

 said buffer layer includes a portion of a film which is made of a material capable of absorbing infrared rays and formed to cover the whole area on the side of said surface of said insulative substrate before the formation of said strong-field drift layer.

4. (Currently Amended) The field ~~emission-type~~ emission electron source according to claim 3, wherein said amorphous layer includes an amorphous silicon layer.

5. (Currently Amended) The field ~~emission-type~~ emission electron source according to claim 3, wherein said strong-field drift layer includes anodized porous polycrystalline silicon.

6. (Currently Amended) The field ~~emission-type~~ emission electron source according to claim 5, wherein said strong-field drift layer includes a plurality of columnar semiconductor crystals each formed along the thickness direction of said lower electrode, and a number of nanometer-order semiconductor nanocrystals residing between said semiconductor crystals, each of said semiconductor nanocrystals having a surface formed with an insulating film which has a thickness less than the grain size of said semiconductor nanocrystal.

7. (Currently Amended) A method of producing the field ~~emission-type~~ emission electron source ~~according to~~ of claim 1, comprising:

forming the lower electrode on the side of said surface of said insulative substrate, and then forming the buffer layer on said lower electrode before forming the strong-field drift layer.

8. (Currently Amended) A method of producing the field ~~emission-type~~ emission electron source ~~according to~~ of claim 6, comprising:

~~a lower electrode forming step~~ of forming the lower electrode on the side of said surface of said insulative substrate;

~~a first film forming step~~ of forming the buffer layer on the side of said surface of said insulative substrate after said lower-electrode forming step;

~~a second film-forming step of forming a polycrystalline semiconductor layer on the surface of said buffer layer;~~

~~a nanocrystallization step of nanocrystallizing at least a portion of said polycrystalline semiconductor layer through an anodizing process to form the semiconductor nanocrystals; and~~

~~an insulating film-forming step of forming the insulating film on the surface of each of said semiconductor nanocrystals.~~

9. (Currently Amended) The method according to claim 8, wherein ~~said second film-forming step~~ the forming of the polycrystalline semiconductor layer is performed after ~~said first film-forming step~~ the forming of the buffer layer without exposing the surface of said buffer layer to the atmosphere.

10. (Currently Amended) The method according to claim 9, in which a plasma CVD process is used as a film-forming process in forming the buffer layer and polycrystalline semiconductor layer ~~each of said first and second film-forming steps~~, wherein when the forming of the buffer layer ~~said first film-forming step~~ is shifted to the forming of the polycrystalline semiconductor layer ~~said second film-forming step~~, a discharge power for said plasma CVD process is changed from a first condition for forming the buffer layer to a second condition for forming the polycrystalline semiconductor layer.

11. (Currently Amended) The method according to claim 9, in which a plasma CVD process is used as a film-forming process in forming the buffer layer and polycrystalline semiconductor layer each of said first and second film-forming steps, wherein when the forming of the buffer layer said first film-forming step is shifted to the forming the polycrystalline semiconductor layer said second film-forming step, a discharge pressure for said plasma CVD process is changed from a first condition for forming the buffer layer to a second condition for forming the polycrystalline semiconductor layer.

12. (Currently Amended) The method according to claim 9, in which a plasma CVD process or catalytic CVD process is used as a film-forming process in forming the buffer layer and polycrystalline semiconductor layer each of said first and second film-forming steps, wherein when the forming of the buffer layer said first film-forming step is shifted to the forming the polycrystalline semiconductor layer said second film-forming step, the partial pressure ratio of source gases for said plasma CVD process or catalytic CVD process is changed from a first condition for forming the buffer layer to a second condition for forming the polycrystalline semiconductor layer.

13. (Currently Amended) The method according to claim 9, in which a plasma CVD process or catalytic CVD process is used as a film-forming process in forming the buffer layer and polycrystalline semiconductor layer each of said first and second film-forming steps, wherein when the forming of the buffer layer said first film-forming step

is shifted to the forming the polycrystalline semiconductor layer said second film-forming step, the kind of source gases for said plasma CVD process or catalytic CVD process is changed from a first condition for forming the buffer layer to a second condition for forming the polycrystalline semiconductor layer.

14. (Currently Amended) The method according to claim 8, which includes between forming the buffer layer and polycrystalline semiconductor layer, said first and second film-forming steps a pre-growth treatment [[step]] of subjecting the surface of the buffer layer to a treatment for facilitating the creation of a crystal nucleus in the initial stage of forming the polycrystalline semiconductor layer said second film-forming step.

15. (Currently Amended) The method according to claim 14, wherein said pre-growth treatment step is a step of comprises subjecting the surface of said buffer layer to a plasma treatment.

16. (Currently Amended) The method according to claim 14, in which said pre-growth treatment step is a step of comprises subjecting the surface of said buffer layer to a hydrogen plasma treatment, wherein forming the polycrystalline semiconductor layer said second film-forming step includes forming a polycrystalline silicon layer serving as the polycrystalline semiconductor layer through a plasma CVD process using a source gas including at least a silane-based gas.

17. (Currently Amended) The method according to claim 14, wherein said pre-growth treatment ~~step is a step of~~ comprises subjecting the surface of said buffer layer to an argon plasma treatment.

18. (Currently Amended) The method according to claim 14, wherein said pre-growth treatment ~~step is a step of~~ comprises forming a layer including a number of silicon nanocrystals, on the surface of said buffer layer.